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A NEW SPECIES OF THE RODENT *PIPESTONEOMYS* FROM THE OLIGOCENE OF NEBRASKA

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In 1956 John C. Donohoe described from the Pipestone Springs formation of Chadronian age in the Montana Oligocene two jaw fragments of a new rodent, *Pipestoncomys bisulcatus*, that he placed in the family Aplodontidae.

The purpose of this paper is to record the occurrence of *Pipestoncomys* in the Chadron formation of Nebraska, to suggest that it be placed tentatively with the castorids rather than with the aplodontids, and to propose a new species of the genus.

North of Crawford, Nebraska, well known exposures of Oligocene sediments occur along the Pine Ridge escarpment. For several years, through the kindness of Frank Arner of Crawford, Nebraska, the Webb School of California has had the privilege of collecting fossils on the Arner ranch. In Sec. 26, T. 33N., R. 53W., Sioux County, Nebraska, are several harvester ant mounds in the Chadron formation, and from these have been collected a rich microfauna including *Pipestoncomys*.

I wish to thank W. D. Turnbull of the Chicago Natural History Museum for the loan of the type specimen of *P. bisulcatus* for study, and Bryan Patterson of Harvard University, and Dr. Mary Dawson of the National Science Foundation for advice. The new species is named in honor of Professor Bryan Patterson. The drawings are by Nick Strekalovsky. The abbreviations refer to the following institutions or collections: C.N.H.M., Chicago Natural History Museum; M.C.Z., Museum of Comparative Zoology; R.A.M., Raymond Alf Museum, Webb School, Claremont, California.

Family CASTORIDAE?

PIPESTONEOMYS PATTERSONI n. sp.

Type: M.C.Z. no. 7113, fragment of left maxilla with M^{1-2} .

Hypodigm: The type and M.C.Z. nos. 7110, RP^4 ; 7106, LP^4 ; 7108, LP^4 ; 7102, LM^1 ; 7111, RM^2 ; 7104, LP^4 ; 7107, RP^4 ; 7103, RM_1 ; 7109, RM_1 ; 7112, RM_1 ; 7101, LM_1 ; and R.A.M. nos. 3072, RM^2 ; 1683, LM^2 ; 671, LM^2 ; 1283, RP^4 ; 2105, RP^4 ; 2104, RM_1 .

Horizon: The base of the Chadron formation along Pine Ridge is marked by a basal conglomerate resting on the weathered surface of the Pierre shale. The top is characterized by the upper purple-white layer, a continuous purple-tinted white limestone designated by Schultz and Stout (1938) as the boundary between the Chadron and the Brulé formations of the White River group in this area. About half way between this and the basal conglomerate there is a second limestone lens, which is referred to as the lower purple-white layer. The specimens come from well below the lower purple-white layer.

Locality: Sec. 26, T. 33N., R. 53W., Sioux County, Nebraska.

Diagnosis: Differing from *P. bisulcatus* as follows: paracone and metacone of M^{1-2} not rounded, paracone and anteroloph not sharply separated, anteroexternal and anterointernal lakes separate, relatively small; M_1 smaller, more rectangular in outline.

Description: The paracone and metacone of M^{1-2} , though distinct and higher than the remainder of the crown, are not the rounded cusps that they are in *P. bisulcatus*. In *P. bisulcatus* the paracone is separated from the anteroloph by a deep groove communicating with the anteroexternal lake, whereas in *P. pattersoni* the separation is very faint. In *P. bisulcatus* the anteroexternal and anterointernal lakes communicate by a slight groove. In *P. pattersoni* the corresponding lakes are completely separate and are also relatively smaller and are more delicately outlined. There is no trace of a mesostyle. P^4 is larger than either M^1 or M^2 . A deep groove separates the anteroloph from the rest of the tooth and communicates openly with a deep valley that separates the paracone-metacone loph from the hypocone. On the anteroloph there is a lake below the anterocone and an embayment projecting inward to the protocone. As on the upper molars, a mesostyle is lacking.

The lower first molar of *P. pattersoni* differs in shape from the corresponding tooth in *P. bisulcatus*, being much more rectangular. It is also smaller and more delicate. P_4 is larger than M_1 .

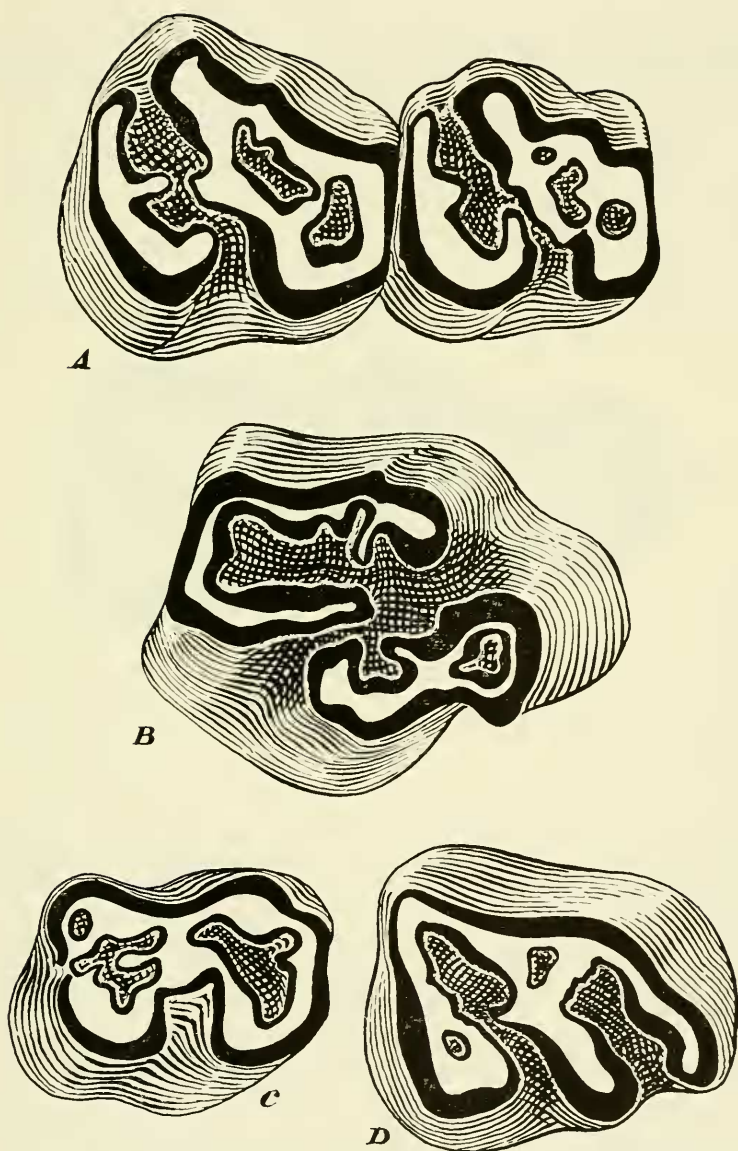


Fig. 1. *Pipestoneomys pattersoni*. A, M.C.Z. no. 7113, left maxillary fragment bearing M¹⁻², type. B, M.C.Z. no. 7110, RP⁴. C, M.C.Z. no. 7103, RM₁. D, M.C.Z. no. 7107, RP₄. X 25.

The anterolophid, metalophid, and posterolophid are well developed and separated by deep grooves that terminate at the metaconid and entoconid. There is a lake posterior to the metaconid and one on the posterolophid adjacent to the hypocones.

Discussion: *Pipestonecomys*, especially in the light of the new evidence reported here, does not fit well into the Aplodontidae. The upper Eocene *Eohaplomys*, the earliest known aplodontid, has the dental formula $\frac{1\ 0\ 2\ 3}{1\ 0\ 1\ 3}$ (Stock, 1935; McGrew, 1941).

This formula is retained to the present. The presence or absence of P^3 is indeterminable in the holotype of *P. bisulcatus*, but a

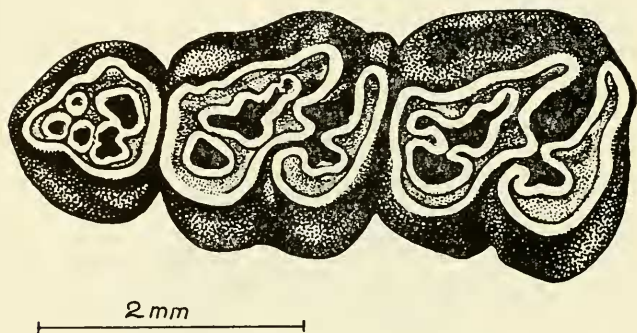


Fig. 2. *Pipestonecomys bisulcatus*. Right M^{1-3} , crown view, C.N.H.M. no. UM 409, type.

small fragment of the maxilla anterointernal to a P^4 of *P. pattersoni* (M.C.Z. no. 7106) shows no sign of the presence of P^3 . P^4 are large relative to the molars. The anterior margin of the masseteric fossa in *P. bisulcatus* extends to beneath the middle part of P^4 , and the ramus is relatively thick and deep. These characters are not typical of the early aplodontids, but are quite like those occurring in castorids. The cheek tooth structure seems to me to accord better with that of castorids than with that of aplodontids. A lower molar of *P. pattersoni* (M.C.Z. no. 7112) was ground down to show the pattern of a well worn tooth. The median external groove (hypoflexid) persists but its medial portion becomes transformed into a lake, forming a pattern similar in general to that found in, e.g., *Paleocastor* (cf. Fig. 3 and Stirton 1935, Fig. 30). The incisor enamel of Recent *Castor*, Miocene *Paleocastor*, and Oligocene *Agnotocastor* is characterized by an orange

color (Wilson 1949), that of aplodontids is not pigmented. Among the many incisors picked out of the ant mounds are a few with orange color, and those of appropriate size could well belong to *P. pattersoni*.

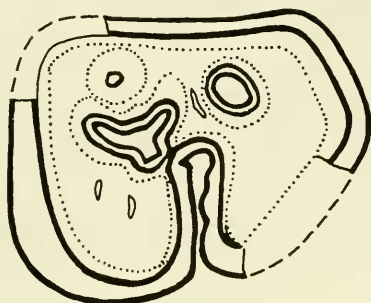


Fig. 3. *Pipestoneomys pattersoni*. M.C.Z. no. 7112, RM₁ ground down to show pattern near base of crown. X 25.

The past and present distribution of aplodontids is also of some interest in this connection. Not only is the range of Recent *Aplodontia* limited to a strip along the west coast of North America, but no unquestioned fossil form has been found east of the Great Basin.¹ If this picture of geographic distribution is adequate, we may have another item of evidence that argues against aplodontid affinities for *Pipestoneomys*.

Pipestoneomys seems to me to fit more reasonably into the Castoridae than into the Aplodontidae, and I know of no other family of appropriate range to which it might be referred. If this tentative assignment is correct, the genus is the earliest beaver so far known, although its position in castorid phylogeny is uncertain.

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¹Shotwell, in his interesting study of the aplodontids (1958), mentions *Pipestoneomys* only in passing, noting that *P. bisulcatus* occurred well to the east of the other known fossils.

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TABLE 1

Pipestoneomys. Upper Dentition

Measurements in millimeters

<i>P. pattersoni</i>				<i>P. bisulcatus</i>
				C.N.H.M. UM 409, type
Crown length				
M ¹	M.C.Z.	7102	1.62	1.78
	M.C.Z.	7113	1.47	
M ²	M.C.Z.	7111	1.48	1.6
	M.C.Z.	7113	1.23	
	R.A.M.	671	1.48	
	R.A.M.	1683	1.62	
	R.A.M.	3072	1.44	
P ⁴	M.C.Z.	7106	2.16	
	M.C.Z.	7108	2.07	
	M.C.Z.	7110	1.98	
Greatest width				
M ¹	M.C.Z.	7102	1.71	1.95
	M.C.Z.	7113	1.67	
M ²	R.A.M.	1683	1.62	1.81
	R.A.M.	671	1.44	
	M.C.Z.	7111	1.35	
	M.C.Z.	7113	1.67	
	R.A.M.	3072	1.35	
P ⁴	M.C.Z.	7106	1.98	
	M.C.Z.	7108	2.09	
	M.C.Z.	7110	1.94	

TABLE 2

Pipestoncomys. Lower Dentition

Measurements in millimeters

<i>P. pattersoni</i>				<i>P. bisulcatus</i> C.N.H.M. UM 408	
Crown length					
M ₁	M.C.Z.	7101	1.44		1.83
	M.C.Z.	7103	1.48		
	M.C.Z.	7109	1.74		
	M.C.Z.	7112	1.89		
	R.A.M.	2104	1.62		
P ₄	M.C.Z.	7104	1.62	dP ₄	1.78
	M.C.Z.	7107	1.51		
	R.A.M.	1283	1.80		
	R.A.M.	2105	1.71		
Greatest width					
M ₁	M.C.Z.	7101	1.51		1.69
	M.C.Z.	7109	1.62		
	M.C.Z.	7112	1.62		
	M.C.Z.	7103	1.35		
	R.A.M.	2104	1.53		
P ₄	M.C.Z.	7104	1.35	dP ₄	1.18
	M.C.Z.	7107	1.42		
	R.A.M.	1283	1.48		
	R.A.M.	2105	1.62		